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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,281	02/25/2002	Ming-Cheng Wu	DP-300809	7095
7590 12/01/2003 VINCENT A. CICHOSZ DELPHI TECHNOLOGIES, INC. Legal Staff, Mail Code: 480-414-420 P.O. Box 5052 Troy, MI 48007-5052			EXAMINER ILDEBRANDO, CHRISTINA A	
			ART UNIT 1725	PAPER NUMBER

DATE MAILED: 12/01/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	<b>Application No.</b> 10/084,281	<b>Applicant(s)</b> WU ET AL.	
	<b>Examiner</b> Christina Ildebrando	<b>Art Unit</b> 1725	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

**A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.**

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 20 October 2003.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 2/25/02 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All   b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.  
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                             | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____  |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____                                    |

**DETAILED ACTION**

***Election/Restrictions***

1. Applicant's election of Pt as the catalytic material and Pb as the modifying agent is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 19 recites the limitation "heating said mixture in a chamber comprising said modifying agent; and introducing said modifying agent to said mixture." This limitation renders the claim indefinite because it is not clear when the modifying agent is introduced, i.e. it is not clear how the chamber with the modifying agent is heated prior to introduction of the modifying agent to the mixture. For the purposes of search and examination, the claim has been examined as though the modifying agent is introduced with the mixture in a chamber and then the chamber is heated.

***Claim Rejections - 35 USC § 102***

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-20, 22-25, and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Wilhelm.

Wilhelm (US 3,607,728) discloses a catalytic composite of a porous carrier material, a Group VIII noble metal component, and a lead component (column 1, lines 5-15). Suitable Group VIII noble metal components include platinum (column 7, lines 5-10). Suitable support materials include alumina, titania, and zirconia (column 4, lines 50-60). The catalyst contains 0.01 to about 2 percent by weight of the Group VIII metal (column 4, lines 15-25). It is taught that the amount of the lead component is preferably sufficient to provide an atomic ratio of lead to noble metal of about 0.05:1 to about 0.9:1, preferably 0.1:1 to about 0.75:1 (column 8, lines 10-25), which meets the range instantly claimed. (The range recited in instant claim 1 yields a Pb/Pt atomic ratio of 0.02:1 to 0.25:1; the range recited in instant claim 4 yields a Pb/Pt atomic ratio of 0.08:1 to 0.15:1). A specific example of a suitable composition contains 0.375 wt% Pt and 0.1 wt% Pb which results in a Pb/Pt atomic ratio of 0.25 (column 8, lines 10-35).

With respect to process claims 12-19, 22-25, and 28: Wilhelm teaches that the catalyst composition is prepared by impregnating the carrier with aqueous solutions of the Group VIII metal and lead (column 6, lines 55-60). The impregnation may be carried

out sequentially, with the lead being impregnated before or after the impregnation of the Group VIII metal (column 6, lines 55-60). Following impregnation, the composite is dried and calcined (column 6, lines 64-65). The catalyst composition may be disposed in a fixed bed or moving bed system prior to use (column 10, lines 10-35). This is considered to meet the limitation "disposing said modified catalyst containing support on or into a substrate" required by instant claim 12.

With respect to claim 19, the drying and calcination step is considered to meet the heating step required by the instant claims. With respect to claim 23, the reference teaches that the catalyst may be prepared by the sequential impregnation of the carrier first with a metal of Group VIII (i.e. meets the formation of a support slurry) followed by impregnation with lead (i.e. meets the formation of a second slurry). It is taught that in order to ensure uniform distribution of the lead component on the carrier, that a volume ratio of impregnation solution to carrier material of at least 1.5:1, preferably 2:1 to 10:1, and to maintain the pH of the solution in the range of 1 to about 7 (column 6, lines 70-75), which meets the ranges required by claims 25 and 28.

As each and every element of the claimed invention is taught in the prior art as recited above, the claims are anticipated by Wilhelm.

### ***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilhelm et al. as applied above for claims 1-20, 22-25, and 28.

The teachings of Wilhelm are as described above for claims 1-20, 22-25, and 28.

Wilhelm teaches that the lead precursor may be lead nitrate (column 6, lines 50-60). The difference between the reference and the claims is that Wilhelm does not teach that the lead nitrate comprises about 60-65 wt% lead, based upon the weight of the lead contained in the modifying agent solution, as required by claim 27.

However, Wilhelm teaches a catalyst composition comprising an amount of lead which meets the amount of lead required by the instant claims. Further, Wilhelm teaches that the presence of lead is very beneficial to the catalyst (column 3, lines 15-20) and further that the ratio of lead to platinum must be controlled to obtain optimal results (column 4, lines 15-25). Additionally, Wilhelm teaches that the volume of solution used to impregnate the composition has an effect upon the distribution of the lead within the final composite (column 8, lines 60-70). One of ordinary skill would recognize that the concentration of lead in the catalyst composite would be a function of the concentration of lead in the solution, which in turn would be a function of the volume of solution and the amount (by weight) of lead contained therein. Therefore, it is the position of the examiner Wilhelm recognizes the amount of lead contained to be a result effective variable. As such, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have optimized the amount of lead contained in the precursor solution in order to obtain the optimal amount of lead in the

composition. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose the instantly claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215.

9. Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wilhelm et al. as applied above for claims 1-20, 22-25, and 28, and further in view of Klein et al.

The teachings of Wilhelm are as described above for claims 1-20, 22-25, and 28.

The difference between the reference and the claims is that Wilhelm does not teach that the catalytic material solution comprises platinum nitrate, wherein said platinum nitrate comprises about 15 to about 19 wt% platinum, based on the weight of said platinum contained in said catalytic material solution, as required by claim 26.

Klein et al. (US 6,077,489) teaches a catalyst composition containing platinum and lead on a support material (column 2, lines 1-6). It is taught that precursors for platinum are known in the art and include platinum compounds such as hexachloroplatinic acid, platinum nitrate, and platinum chloride (column 2, lines 64-66).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the teachings of Wilhelm to include the use of platinum nitrate as the platinum precursor in light of teachings by Klein et al. The teachings of Klein et al. establish that platinum nitrate is an art recognized functional equivalent of the platinum precursors taught by Wilhelm. One of ordinary skill would

have been motivated to substitute any known, functionally equivalent platinum precursor in the process of Wilhelm, with a reasonable expectation of success.

The modified disclosure of Wilhelm further does not teach the amount of platinum contained within the solution. However, Wilhelm teaches a catalyst composition comprising an amount of platinum which meets the amount of platinum required by the instant claims. Further, Wilhelm teaches that the presence of platinum is very beneficial to the catalyst (column 7, lines 5-20) and further that the ratio of lead to platinum must be controlled to obtain optimal results (column 4, lines 15-25). Additionally, Wilhelm teaches that the volume of solution used to impregnate the composition has an effect upon the distribution of the platinum within the final composite (column 8, lines 60-70). One of ordinary skill would recognize that the concentration of platinum in the catalyst composite would be a function of the concentration of platinum in the solution, which in turn would be a function of the volume of solution and the amount (by weight) of platinum contained therein. Therefore, it is the position of the examiner Wilhelm recognizes the amount of platinum contained to be a result effective variable. As such, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have optimized the amount of platinum contained in the precursor solution in order to obtain the optimal amount of platinum in the composition. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art,



discovering the optimum or workable ranges involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215.

10. Claims 1, 4-18, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abdo et al.

Abdo et al. (US 6,299,995) discloses a catalyst useful for the selective oxidation of carbon monoxide. The catalyst composition comprises 0.5 to 5 wt%, preferably 1 to 3 wt%, ruthenium, supported on a porous carrier (column 5, lines 35-60). Suitable carriers include alumina, titania, and zirconia (column 6, lines 1-25). It is taught that ruthenium is supported on the catalyst support by impregnation (column 8, lines 40-65). Abdo et al. teaches that the catalyst composition may contain additional components which act to improve catalyst activity, selectivity, or stability, including antimony, arsenic, and bismuth (column 9, lines 25-35). The additional component may be added to the carrier material or to the catalytic composite at any point during its preparation (column 9, lines 35-40). It is taught that the catalyst is disposed in a reactor during use (see columns 11-12) (considered to meet "disposing said modified catalyst containing support in or into a substrate" required by claim 12). Abdo et al. further teaches that the selective oxidation catalyst may be used in conjunction with a fuel cell system containing a reformer, the selective oxidation catalyst, and a fuel cell (column 12, claim 1).

The difference between the reference and the claims is that the reference does not disclose that the modifying agent is present in an amount of about 2 to 25 atomic percent as required by claims 1, 12, and 29, or the amount of modifying agent present, as required by claims 9-11 and 16-18.

However, the Abdo et al. reference teaches that the modifying agent serves to improve the catalyst activity, selectivity, and stability (column 9, lines 25-35). Therefore, it is the position of the examiner that the reference recognizes the amount of the modifying agent to be a result effective variable. It would have been obvious to one having ordinary skill in the art at the time the invention was made to choose the instantly claimed ranges through process optimization, since it has been held that there the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. See *In re Boesch*, 205 USPQ 215. In this case, one of ordinary skill would have been motivated to optimize the concentration of the modifying agent to arrive at the ranges instantly claimed in order to obtain a carbon monoxide selective catalyst having improved activity, selectivity, or stability.

### ***Conclusion***

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Rotgerink et al. (US 5,849,657), Hindin et al. (US 3,666,813), Trinh Dinh et al. (US 4,504,593), and Smits (US 4,620,034) disclose catalyst compositions containing platinum and lead.

Towler et al. (US 6,280,864), Aoyama (US 6,416,894), Borup et al. (US 6,162,558), Aoyama (US 6,290,913), Rehg et al. (US 6,245,214), Soma et al. (US 5,612,012), and Yasumoto et al. (US 5,702,838) disclose fuel cell systems.

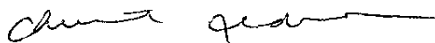
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12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christina Ildebrando whose telephone number is (703) 305-0469. The examiner can normally be reached on Monday-Friday, 7:30-5, with Alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Dunn can be reached on (703) 308-3318. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0651.

  
Christina Ildebrando  
Patent Examiner  
Art Unit 1725  
11/22/03

CAI  
November 21, 2003